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EXAMINER	
YU, LIHONG	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/560,552	RIES, LIONEL
	Examiner	Art Unit
	LIHONG YU	2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *05 May 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5,8,9 and 12-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5,8,9 and 12-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, received on May 5, 2011, with respect to claim rejections have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schilling (US 6,396,824 B1) in view of Lin (US 2001/0020216 A1) and Crow et al (US 3,740,671).

Consider claims 1 and 9:

Schilling discloses a method for demodulation of radio navigation signals that are transmitted in spread spectrum (*see Schilling at col. 2, lines 10-24, where Schilling describes a method that can be used in a spread-spectrum CDMA communication system for geo-locating a*

remote unit) and that comprises (i) a data channel that is modulated by a navigation message (*see Schilling at col. 2, lines 10-24, where Schilling describes a modulated message data signal*) and (ii) a pilot channel that is not modulated by the navigation message (*see Schilling at col. 2, lines 10-24, where Schilling describes using a separate spread-spectrum channel as a pilot signal; see col. 2, lines 50-55, where Schilling describes the pilot channel is not modulated*), the data channel and the pilot channel being combined into one multiplexing scheme in order to modulate a carrier (*see Schilling at col. 3, lines 26-46, where Schilling describe combining the base-generic-chip-code signal, i.e. the pilot signal, with the spread-spectrum processed message data to generate a CDMA signal to be transmitted; see col. 7, lines 45-50, where Schilling describes the carrier frequency is* f_0), the method comprising:

- generating a de-spread data signal by subjecting the signals of the pilot and data channels to de-spreading processing (*see Schilling at Fig. 2, col. 7, lines 51-67 and col. 8, lines 1-37, where Schilling describes that generic mixer 123 uses the replica of the generic-chip-code signal for dispreading the CDMA signal; the message mixer 124 uses the replica of the message-chip-code signal for dispreading the CDMA signal*); and
- demodulating the de-spread data signal in order to obtain the navigation message (*see Schilling at Fig. 2 and col. 8, lines 38-45, where Schilling describes the detector 139 demodulates the modulated data signal to get the message data*),
- wherein the demodulation of the despread data signal used to obtain the navigation message is performed with the aid of the carrier obtained from the despreading processing of the pilot channel (*see Schilling at Fig. 2, col. 7, lines 60-67 and col. 8,*

lines 1-7, where Schilling describes that the dispreading using the generic-chip-code signal produces the recovered carrier signal; see col. 7, lines 5-12, where Schilling describes that the detector 139 uses the recovered carrier signal),

- wherein the despreading processing is performed by code tracking processing combined with at least one of carrier phase tracking processing or carrier frequency tracking processing (*see Schilling at Fig. 2 and col. 8, lines 8-26, where Schilling teaches a Acquisition and Tracking circuit 131 that acquires and tracks the carrier signal and provides input to the message-chip-code generator 122 that is used in dispreading; see col. 7, lines 51-67, where Schilling teaches using a replica of the generic-chip-code signal for dispreading the CDMA signal*).

However, Schilling does not specifically disclose (1), determining Doppler velocity aid using a discrete navigation system that does not rely only on the radio navigation signals, wherein the discrete navigation system combines information from the radio navigation signals with other information that is independent of the radio navigation signals, and (2), the above code tracking processing is performed using a delay-lock loop (DLL) or an open-loop device, and (3), the above carrier tracking processing is performed using an open-loop device.

Regarding (1) and (2) above, Lin teaches (1), determining Doppler velocity aid using a discrete navigation system that does not rely only on the radio navigation signals, wherein the discrete navigation system combines information from the radio navigation signals with other information that is independent of the radio navigation signals (*see Lin in Fig. 5 and paragraph 0105, where Lin describes the Integrated Kalman Filter 60 that generates navigation solution*

and velocity aiding information based on input from the GPS/RF/IF Unit 10, that is the radio navigation signals, and also based on input from the IMU, that is other information that is independent of the radio navigation signals; see paragraph 0050, where Lin describes that the velocity information is used for tracking the Doppler-drifted signals), and (2), the code tracking processing is performed using a delay-lock loop (DLL) (*see Lin in paragraph 0105, where Lin describes a code tracking loop that comprises a digital delay-lock loop*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Schilling, and to include determining the above Doppler velocity aid and to have DLL for code tracking, as taught by Lin, thus allowing for improving GPS measurement accuracy and anti-jamming capability, as discussed by Lin (*see Lin in paragraph 0046*).

Regarding (3) above, Crow teaches a carrier tracking processing is performed using an open-loop device (*see the Abstract and col. 16, lines 9-16, where Crow describes a filter device that is used to track carrier signals, the filter has an open-loop transfer function*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Schilling, and to include that the carrier tracking processing is performed using an open-loop device, as taught by Crow, thus allowing for reducing implementation cost, as discussed by Crow (*see col. 2, lines 40-50*).

Consider claim 5:

Schilling in view of Lin and Crow discloses the method as claimed in claim 1 above. Schilling discloses that the pilot channel and the data channel are multiplexed in accordance with

a scheme in which the carrier includes at least the data channel and the pilot channel (*see Schilling at Fig. 2 and col. 7, lines 39-50, where Schilling teaches a modulator 107 that modulates the combined generic-chip-code signal, that is the pilot channel, and spread-spectrum-processed signal, that is the data channel, by a carrier signal at a carrier frequency* f_0).

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schilling (US 6,396,824 B1) in view of Lin (US 2001/0020216 A1) and Crow et al (US 3,740,671), as applied to claim 1 above, and further in view of Clapp (US 5,943,248).

Consider claim 2:

Schilling in view of Lin and Crow discloses the method as claimed in claim 1 above. Schilling discloses the signal combiner that combines the pilot channel and the data channel (*see Schilling in Fig. 2, item 105 and col. 11, lines 14-30*). However, Schilling does not specifically disclose the signal combination is time multiplexed.

Clapp teaches time-multiplexing signal combination (*see Clapp at col. 2, lines 60-67 and col. 3, lines 1-2, where Clapp describes the combination of a first and a second input values with a signal combiner that is a time multiplexed combiner*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Schilling, and to have time multiplexed data channel and pilot channel,

as taught by Clapp, thus allowing for hardware efficient signal combination, as discussed by Clapp (*see Clapp at col. 1, lines 65-67 and col. 2, lines 1-7*).

5. Claims 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schilling (US 6,396,824 B1) in view of Lin (US 2001/0020216 A1) and Crow et al (US 3,740,671), as applied to claim 1 above, and further in view of Fujimura (US 3,568,066).

Consider claim 3:

Schilling in view of Lin and Crow discloses the method as claimed in claim 1 above. Schilling discloses the signal combiner that combines the pilot channel and the data channel (*see Schilling in Fig. 2, item 105 and col. 11, lines 14-30*). Schilling discloses that the pilot channel and the data channel are phase modulated (*see Schilling at col. 4, lines 62-67, where Schilling teaches that the received signals are phase modulated*).

However, Schilling does not explicitly disclose the signal combination is phase-multiplexed.

Fujimura teaches phase-multiplexed signal combination (*see Fujimura in col. 7, lines 10-20, where Fujimura describes three channels are phase multiplexed*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Schilling, and to have phase multiplexed data channel and pilot channel, as taught by Fujimura, thus allowing for accurate, efficient and reliable phase modulation, as discussed by Fujimura (*see Fujimura at col. 2, lines 60-63*).

Consider claim 8:

Schilling in view of Lin and Crow discloses the method as claimed in claim 1 above. Schilling discloses that the method is applied to at least one of (i) demodulation of satellite navigation signals of GPS-IIF L5, L2C type, or (ii) demodulation of satellite navigation signals transmitted by one of a GALILEO system, ground stations, modernized GLONASS satellites, COMPASS satellites, or QZS satellites (*see Schilling at the abstract, where Schilling describes a base station for transmitting message data in a system for locating remote units*).

6. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schilling (US 6,396,824 B1) in view of Lin (US 2001/0020216 A1) and Crow et al (US 3,740,671), as applied to claim 9 above, and further in view of Lloyd et al (US 7,183,971 B1).

Consider claim 12:

Schilling in view of Lin and Crow discloses the receiver as claimed in claim 9 above. Schilling does not disclose that the frequency-lock loop (FLL) comprises a discriminator of extended arctangent form.

Lloyd teaches a frequency-lock loop (FLL) comprises a discriminator of extended arctangent form (*see Lloyd at Fig. 4 and col. 10, lines 6-43, where Lloyd describes a FLL with an arctangent frequency discriminator 412*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Schilling, and to have FLL with a discriminator of extended arctangent form, as taught by Lloyd, thus allowing for a broad range of selection of the loop update rate, as discussed by Lloyd (*see Lloyd at col. 10, lines 26-43*).

Consider claim 13:

Schilling in view of Lin and Crow discloses the receiver as claimed in claim 9 above. Schilling does not disclose that the frequency-lock loop (FLL) comprises one of a first-order and a second-order loop filter which is adapted to the dynamics of the received signals.

Lloyd teaches a frequency-lock loop (FLL) comprises a first-order or second-order loop filter which is adapted to the dynamics of the received signals (*see Lloyd at Fig. 4 and col. 10, lines 55-67, where Lloyd describes a first-order FLL loop filter 414*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Schilling, and to have a first-order or second-order loop filter, as taught by Lloyd, thus allowing for a broad range of selection of the loop update rate, as discussed by Lloyd (*see Lloyd at col. 10, lines 26-43*).

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schilling (US 6,396,824 B1) in view of Lin (US 2001/0020216 A1), Crow et al (US 3,740,671) and Lloyd et al (US 7,183,971 B1), as applied to claim 13 above, and further in view of David (US 6,538,599 B1).

Consider claim 14:

Schilling in view of Lin, Crow and Lloyd discloses the receiver as claimed in claim 9 above. However, Schilling does not disclose (1), an output of the filter is coupled to the delay-lock loop (DLL), and (2), the delay-lock loop comprising a zero-order loop filter.

Regarding item (1), Thomas discloses the output of the filter of a frequency-lock loop (FLL) is coupled to the delay-lock loop (DLL) (*see Thomas at Fig. 7, col. 22, lines 64-67 and col. 23, lines 1-23, where Thomas shows the output of a FLL is connected to the input of a DLL*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Schilling, and to have that the output of the filter of the frequency-lock loop (FLL) is coupled to the delay-lock loop (DLL), as taught by Thomas, thus allowing for simultaneous cross-channel and co-channel interference mitigation, as discussed by Thomas (*see Thomas at col. 23, lines 24-29*).

Regarding item (2), David teaches using a zero-order filter (*see David at col. 4, lines 15-37, where David describes a zero-order filter is utilized in a circuit*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Schilling, and to have a zero-order filter, as taught by David, thus allowing for achieving further processing gains, as discussed by David (*see David at col. 4, lines 15-37*).

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schilling (US 6,396,824 B1) in view of Lin (US 2001/0020216 A1) and Crow et al (US 3,740,671), as applied to claim 9 above, and further in view of Kowalski (US 6,470,044 B1).

Consider claim 15:

Schilling in view of Lin and Crow discloses the receiver as claimed in claim 9 above. However, Schilling does not disclose that the delay-lock loop (DLL) comprises a discriminator that is applied to the despread pilot and data signals, the despread data signal being weighted by a coefficient that depends on a signal-to-noise spectral density ratio (C/N_0) of the radio navigation signals.

Kowalski teaches a delay-lock loop (DLL) that comprises a discriminator which is applied to a pilot signals and to a data signals (*see Kowalski at Fig. 2 and col. 10, lines 1-15, where Kowalski describes a DLL that has a first input connected to a finger receiver and a second input to receive a pilot signal*), the data signals being weighted by a coefficient which depends on the signal-to-noise spectral density ratio (C/N_0) of the received signals (*see Kowalski at Fig. 3 and col. 11, lines 5-11, where Kowalski describes that the receiver selectively weights the received signal to emphasize the signal to noise ratio*).

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Schilling, and to have that the delay-lock loop (DLL) comprises a discriminator which is applied to the pilot signals and to the data signals, the data signals being weighted by a coefficient which depends on the signal-to-noise spectral density ratio (C/N_0) of

the received signals, as taught by Kowalski, thus allowing for maximizing the signal to noise ratio in the presence of colored noise, as discussed by Kowalski (*see Kowalski at col. 8, lines 48-58*).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LIHONG YU whose telephone number is (571)270-5147. The examiner can normally be reached on 8:30 am-7:00 pm Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lihong Yu/
Examiner, Art Unit 2611
/Shuwang Liu/
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